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Supplemental Material

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Two Distinct Phases of North Atlantic Eastern Subpolar Gyre and Warming Hole Evolution
under Global Warming

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Supplementary materials for **Two distinct phases of North Atlantic Eastern Subpolar Gyre and Warming Hole evolution under Global Warming** by Ghosh et al

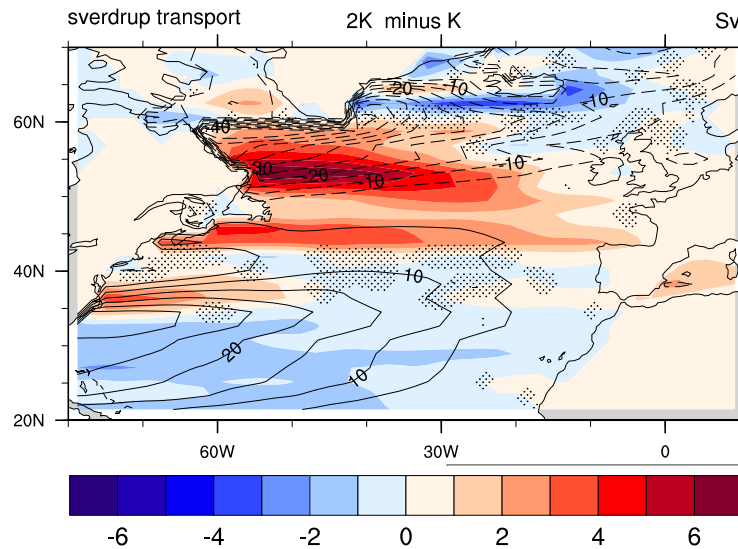


Fig S1. In colors are the difference of the ensemble mean annual wind driven Sverdrup transport between 2 K GMST warming and 0 K GMST warming levels in the MPI-GE 1% CO₂ increase per year experiment. Contours are the ensemble mean annual wind driven Sverdrup transport or the climatology at 0 K GMST warming state. The unstippled regions are statistically significant at $p < 0.05$.

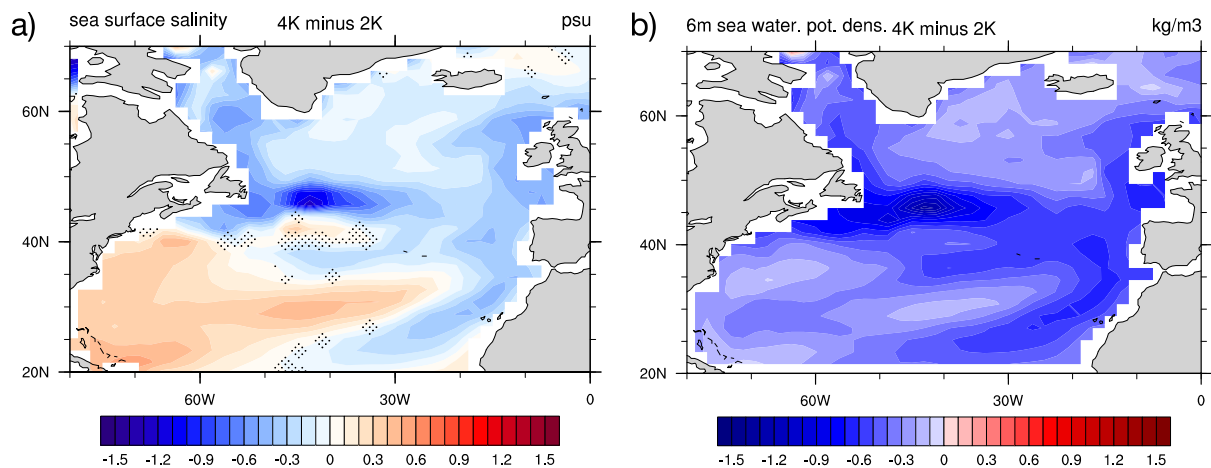


Fig S2. The difference of the ensemble mean **a)** annual sea surface salinity (in psu) and **b)** annual 6 m potential density (in kg/m³) between 4 K GMST warming and 2 K GMST warming levels in the MPI-GE 1% CO₂ increase per year experiment. The unstippled regions are statistically significant at $p < 0.05$.

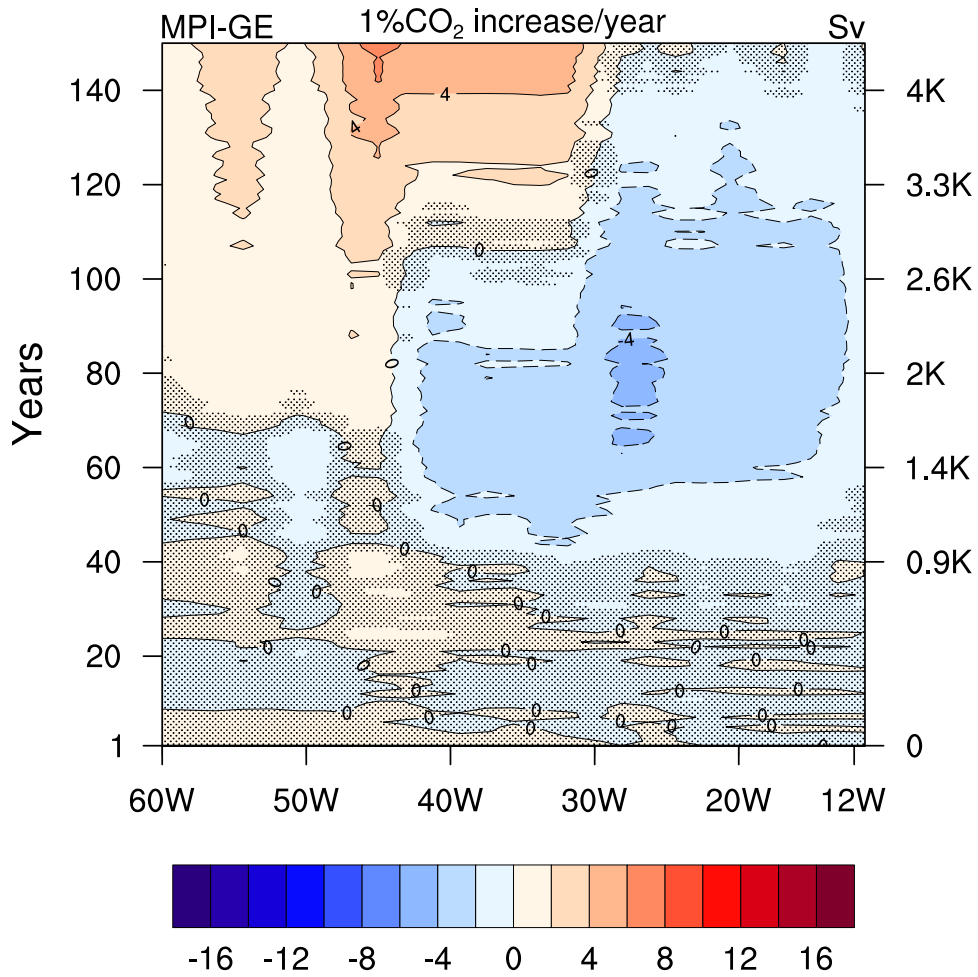


Fig S3. The Hovmuller diagram of the difference of the ensemble mean annual barotropic stream function on a certain year from the year 1 for 1%CO₂ increase per year experiment of MPI-GE, averaged over the latitude 40° to 50°N spanning the North Atlantic Ocean basin (60°W to 10°W). Negative (positive) values show enhanced cyclonic (anti-cyclonic) circulation. The differences that are significant at $p < 0.05$ are unstippled. Units are in Sverdrup (Sv).

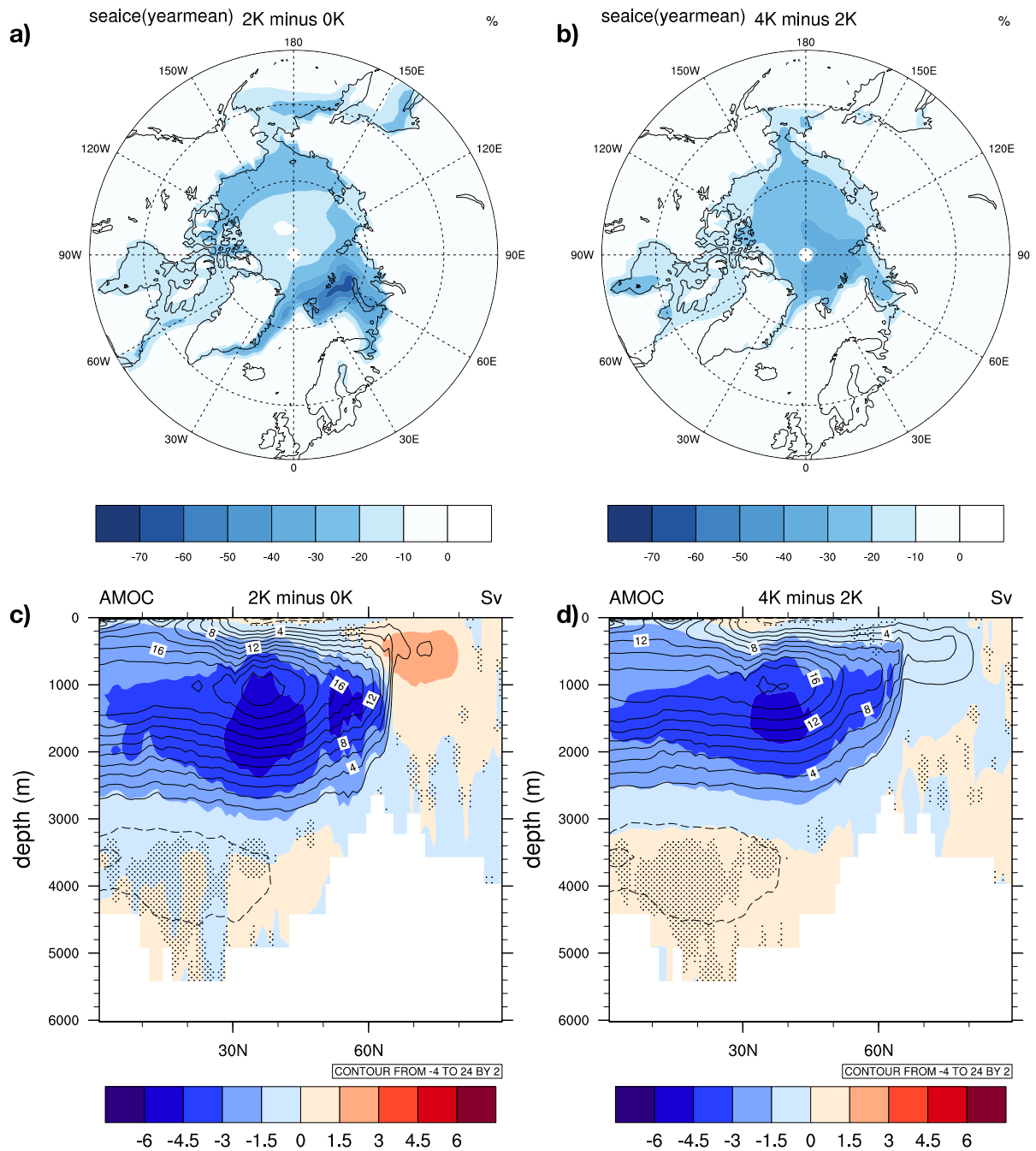


Fig S4. The difference of the ensemble mean sea ice area (in %) a) between 2K global mean surface air temperature (GMST) warming and 0 K GMST warming levels and between 4K GMST warming and 2K GMST warming levels in MPI-GE 1%CO₂ experiment. c) and d) are same as a) and b) but for the Atlantic Meridional Overturning Circulation (AMOC). The contours in c) and d) show the climatologies of AMOC at 0 K and 2K GMST warming state. The unstippled regions are statistically significant at $p < 0.05$.